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Bakeman, Use of Residual Gas Analysis in Low-Pressure Semiconductor Process Reactors, V. 37, No. 2, p. 57. (Abstract—see Reath, M.)

Baseman, R.J., Measured effects of Reduced Flow Velocity in a Laminar Flow Cleanroom, V. 37, No. 3, p. 41. (Abstract—see Carr, P.E.)

Bateman, V.I., Evaluation of Shock Mitigating Materials in a V-Band Pyroshock Environment Simulated with a Resonant Fixture, V. 37, No. 5., p. 40. *An explosively activated V-band joint is used on a multistage rocket payload to release components at prescribed times in the rocket's flight and creates a pyroshock environment that the other payload components must survive. Accelerometer response data were measured close to an actual V-band pyroshock. With the shock spectra calculated from these data, a resonant fixture was designed to simulate a V-band pyroshock event. The characteristics of the data and the design process are described.* (DTE: Shock and Vibration)

Brannen, J., Use of Residual Gas Analysis in Low-Pressure Semiconductor Process Reactors, V. 37, No. 2, p. 57. (Abstract—see Reath, M.)

Brown, F.A., Evaluation of Shock Mitigating Materials in a V-Band Pyroshock Environment Simulated with a Resonant Fixture, V. 37, No. 5, p. 40. (Abstract—see Bateman, V.I.)

Buck, A.L., A Cryogenic, Low-PPB Range Moisture Analyzer for Process Gases, V. 37, No. 1, p. 31. *This paper discusses a commercial cryogenic chilled mirror moisture analyzer that was developed and tested for use with semiconductor process gases. The analyzer was evaluated by the methodology proposed at the Microcontamination 1992 Conference. The system is continuously reading, responds to moisture upsets within 40 sec, and can be used reliably at single-digit ppb moisture levels. With the analyzer, the gas system can be connected, purged-down, and be able to monitor at the 10 ppb level within 2 hr.* (CC: Identification, Measurement, and Monitoring, Manufacturing Processes)

C

Campaneria, J., Design and Certification of High Purity Delivery Systems for Semiconductor Wafer Cleaning Chemicals, V. 37, No. 6, p. 32. (Abstract—see Grant, D.C.)

Carr, P.E., Measured effects of Reduced Flow Velocity in a Laminar Flow Cleanroom, V. 37, No. 3, p. 41. *This paper describes a study to determine the impact on airborne and surface particulate contamination to be expected from reducing vertical laminar flow from a nominal 90 fpm to a nominal 65 fpm in a cleanroom that operates near Class 1 at 90 fpm. The challenge was a set of repeated handling and carrying steps, with measurements made of the airborne concentrations, the concentrations on monitor wafers in the room, and the concentrations on wafers in carriers used during handling and transport.* (CC: Cleanroom Design/Materials, Identification, Measurement, and Monitoring)

Caruso, H.J., Vibration Test Time Compression and MIL-HDBK-781 vs. MIL-STD-810E, V. 37, No. 1, p. 24. *Vibration issues associated with MIL-STD-810E and MIL-HDBK-781 are defined. Differences and similarities associated with the test goals and application of each document are examined. Use of these documents for establishing test time compression algorithms related to fatigue life (durability) and reliability evaluations is discussed. Specific inconsistencies between the vibration models in each document for jet aircraft equipment are identified. Recommendations are offered for bringing these documents into agreement to provide increased uniformity and correlation of results through a test program.* (DTE: Criteria and Standards, Shock and Vibration, Test Tailoring; PR: Crite-

ria and Standards, Durability/Fatigue)

Chan, H.A., A Formulation of Product Reliability through Environmental Stress Testing and Screening, V. 37, No. 2, p. 50. *This paper describes the basic concepts of product reliability and stress testing in an intuitive way. The intent is to provide a simple language for the formulation of stress testing and to provide a background for understanding and optimizing the economics of stress testing. Other topics include reliability considerations for a product, product strength requirements, and the reliability improvement process.* (PR: Reliability Achievement, Stress Screening)

Charest, D., Design and Certification of High Purity Delivery Systems for Semiconductor Wafer Cleaning Chemicals, V. 37, No. 6, p. 32. (Abstract—see Grant, D.C.)

Chesters, S., Estimating the Lifetime of Electropolished Stainless Steel (EPSS) Tubing in Corrosive Gas Services, V. 37, No. 4, p. 28. (Abstract—see Wang, H-C.)

Cooper, D.W., Measured effects of Reduced Flow Velocity in a Laminar Flow Cleanroom, V. 37, No. 3, p. 41. (Abstract—see Carr, P.E.)

Crawford, G.L., Reliable Application of Surface Mount Technology in a High-Performance Military Jet Aircraft Environment, V. 37, No. 2, p. 40. *Surface mount technology (SMT) has become a dominant force in modern aerospace electronics. Many avionics manufacturers have "jumped on the SMT bandwagon" without fully understanding the complex design and manufacturing issues. This paper addresses the most critical issues.* (DTE: Climatics and Thermal, Shock and Vibration; PR: Durability/Fatigue)

D

de Groh, K.K., Leveling Coatings for Reducing Atomic Oxygen Defect Density in Graphite Fiber-Epoxy Composites, V. 37, No. 3, p. 26. (Abstract—see Jaworske, D.A.)

Doddi, G., Estimating the Lifetime of Electropolished Stainless Steel (EPSS) Tubing in Corrosive Gas Services, V. 37, No. 4, p. 28. (Abstract—see Wang, H-C.)

E

Egbert, H., Proposed Method 510.4 Sand and Dust (Technical Department Reports), V. 37, No. 5, p. 19. **(Abstract—see Sullivan, J.)**

F

Feinberg, A.A., Accelerated Reliability Growth Models, V. 37, No. 1, p. 17. *Extending reliability growth so it can be applied in the area of accelerated testing allows the application of reliability growth tools and their planning advantages. This paper describes linking these two areas together into accelerated reliability growth testing (ARGT). Mathematical equations of ARGT for iso-stress and step-stress accelerated testing are modeled.* (PR: Criteria and Standards, Reliability Achievement)

Fosnight, W.J., Measured effects of Reduced Flow Velocity in a Laminar Flow Cleanroom, V. 37, No. 3, p. 41. (Abstract—see Carr, P.E.)

G

Grant, D.C., Design and Certification of High Purity Delivery Systems for Semiconductor Wafer Cleaning Chemicals, V. 37, No. 6, p. 32. *The wafer cleaning procedures used in new semiconductor manufacturing facilities require extremely high purity chemicals. Careful management of the chemicals from their manufacturing site to the points of use within the wafer fabrication facility is required. This paper describes the technology used to supply 15 types of chemicals to more than 60 points of use in the TECH Semiconductor wafer fab in Singapore. Several challenges associated with the initial design and installation of the chemical delivery system and their resolution are also described.* (CC: Identification, Measurement, and Monitoring, Manufacturing Processes)

H

Haider, A.M., Interactions of Ceramic, Metallic and Polymeric Filters with Gaseous Contaminants, V. 37, No. 3, p. 19. *This paper explores the outgassing characteristics of ceramic, metallic, and polymeric filters for H_20, O_2, and CH_4 using APIMS. The outgassing data were normalized with respect to the parameters that varied from one filter to the other. Hydrocarbon outgassing was also studied both at room temperature from freshly installed filters and at elevated temperatures.* (CC: Filters and Filtration, Manufacturing Processes, Sources and Effects)

Henderson, G., A Proposed Method of Standardizing Shock Machines Using SRS Analysis, V. 37, N. 4, p. 40. *A proposed method of standardizing shock machines in terms of the spectral fidelity of their shock accelerations is presented. The paper provides enough SRS theory to aid the reader in understanding the proposed method and in evaluating the results. A set of normalized SRS spectra for nominal pulses of the types used on shock machines is described. A five-step procedure for the use of analysis and comparison with expected SRS results for the nominal shock machine acceleration is also described.* (DTE: Criteria and Standards, Shock and Vibration)

Hu, J.M., Temperature Spectrums of an Automotive Environment for Fatigue Reliability Analysis, V. 37, No. 6, p. 19. *The temperature spectrum of an automotive environment is a necessary input to predict thermal fatigue life, to estimate product reliability, and to specify accelerated thermal cycle testing for automotive components. This paper investigates the temperature profiles of electronic products located in the engine compartment, the engine-mounted area, and the passenger/luggage compartment, and develops the nominal temperature spectrums for these vehicle locations. The daily climatic temperatures of various geographical areas in the U.S. are analyzed. The effects of sun exposure and operational heat dissipation on the maximum temperature in the vehicle compartments are investigated.* (DTE: Climatics and Thermal, Test Tailoring, Test Time Compression; PR Durability/Fatigue, Reliability Achievement)

J

Jaworske, D.A., Leveling Coatings for Reducing Atomic Oxygen Defect Density in Graphite Fiber-Epoxy Composites, V. 37, No. 3, p. 26. *Pinholes or other defect sites in a protective oxide coating provide pathways for atomic oxygen in low-Earth orbit to reach underlying material. This paper discusses a concept for enhancing the lifetime of materials in low-Earth orbit by applying a leveling coating to the material prior to applying reflective and protective coatings. Using a surface-tension-leveling coating concept, a low-viscosity epoxy was applied to the surface of several composite coupons. A protective layer of 1000 Å of SiO_2 was deposited on top of the leveling coating and the coupons were exposed to an atomic oxygen environment in a plasma asher.* (CC: Manufacturing Processes, Sources and Effects; DTE: Solar and Space Simulation)

Jurcik, B. Using Simulation to Optimize Gas Distribution Cost and Performance, V. 37, No. 5, p. 30. (Abstract—see McAndrew, J.),

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Kaur, D., Design and Certification of High Purity Delivery Systems for Semiconductor Wafer Cleaning Chemicals, V. 37, No. 6, p. 32. (Abstract—see Grant, D.C.)

L

Lebel, R., Use of Residual Gas Analysis in Low-Pressure Semiconductor Process Reactors, V. 37, No. 2, p. 57. (Abstract—see Reath, M.)

Lindsley, M.L., Using Environmental Databases to Develop Long-Term Stability Test Profiles: A Case Study, V. 37, No. 3, p. 32. *This paper presents a case study example of developing a long-term stability test profile using environmental databases to formulate a life-cycle environmental profile. The methods for using the database within the life-cycle environmental profile are presented. Using the environmental database along with limited data-collection activities enabled the development of a realistic long-term stability test.* (DTE: Climatics and Thermal, Test Tailoring)

Lye, I., Design and Certification of High Purity Delivery Systems for Semiconductor Wafer Cleaning Chemicals, V. 37, No. 6, p. 32. (Abstract—see Grant, D.C.)

Lynn, C., Design Considerations for Minienvironment Cleanrooms (Issues, Options, and Concepts), V. 37, No. 6, p. 41. *Many new cleanroom facilities are designed and constructed using various minienvironment concepts. This paper covers the facility concepts being implemented today and those planned for the future. Factors and issues that lead owners to the decision to use minienvironments, as well as the impact of the decision on facility design are included. A comparison of various designs, including first cost and operating cost, is presented. Case studies show the advantages of implementing minienvironments, the flexibility issues, and potential operating cost savings.* (CC: Cleanroom Design/Materials, Cleanroom Operation/Procedures)

M

Ma, C., Interactions of Ceramic, Metallic and Polymeric Filters with Gaseous Contaminants, V. 37, No. 3, p. 19. (Abstract—see Haider, A.M.)

McAndrew, J., Using Simulation to Optimize Gas Distribution Cost and Performance, V. 37, No. 5, p. 30. *Numerical simulation of the behavior of gas distribution systems is a powerful tool which can be used to convert the often - confusing results of tests on individual components into a coherent picture of the whole system. This paper presents an approach to numerical simulation and an example of its use to specify sampling lines connecting the main gas line to moisture analyzers. A model for particle filters is outlined and its predictions compared with experiment. Criteria for validation of numerical simulation methods are discussed briefly.* (CC: Filters and Filtration, Manufacturing Processes, Modeling and Simulation)

McCollum, T.A., Leveling Coatings for Reducing Atomic Oxygen Defect Density in Graphite Fiber-Epoxy Composites, V. 37, No. 3, p. 26. (Abstract—see Jaworske, D.A.)

McDonald, B., Scanning HEPA Filters with Photometers, V. 37, No. 5, p. 48. *HEPA and ULPA filters such as those used in cleanrooms and clean benches are often scanned or probed for leaks. Historically, filters were scanned with a light scattering photometer that measures the light scattered from many particles simultaneously. While particle counting methods have been introduced, the photometer methods are still used in many cases. This paper sets forth a model for photometer response characteristics. Photometer response to a leak while scanning is modeled as a simple exponential process. The model is verified with experimental data. Time constants for the experimental system were determined. The effect of the response time on the ability to detect leaks is discussed. Methods to compensate for the loss of sensitivity during scanning are also presented.* (CC: Cleanroom Operation/Procedures, Filters and Filtration, Identification, Measurement, and Monitoring, Modeling and Simulation)

McNelis, M., Implementation of Acoustic Blankets in Energy Analysis Methods with Application to the Atlas Payload Fairing, V. 37, No. 4, p. 32. (Abstract—see Weissman, K.)

Mendias, M.L., Pollution Prevention/Environmental Life Cycle Impact Analyses: Are your Products Affected? V. 37, No. 1, p. 36. *Life cycle environmental engineering is a new technology that has emerged for aerospace manufacturers. The Department of Defense (DoD) now incorporates these requirements into its acquisition policies and directives. The paper defines these directives from a generic manufacturers' approach, develops a game plan for addressing these directives, and discusses the impact of life cycle engineering on a company's products.* (CC: Criteria and Standards; DTE: Criteria and Standards)

N

Neale, M.P., Effects of Phase Relationship in Helicopter Vibrations, V. 37, No. 6, p. 26. (Abstract—see Richards, D.P.)

P

Palm, P., Design and Certification of High Purity Delivery Systems for Semiconductor Wafer Cleaning Chemicals, V. 37, No. 6, p. 32. (Abstract—see Grant, D.C.)

Pelletier, M.P., Multichannel Simultaneous Digital Tracking Filters for Swept Sine Vibration Control, V. 37, No. 5, p. 23. *This paper discusses the digital control of swept sinewave tests and the associated theory needed for swept sinewave synthesis and analysis. The paper concentrates on the details of output signal generation to enhance its accuracy and suitability for complex heterodyne generation.* (DTE: Shock and Vibration)

Podojil, G.M., Leveling Coatings for Reducing Atomic Oxygen Defect Density in Graphite Fiber-Epoxy Composites, V. 37, No. 3, p. 26. (Abstract—see Jaworske, D.A.)

Pordan, W., Implementation of Acoustic Blankets in Energy Analysis Methods with Application to the Atlas Payload Fairing, V. 37, No. 4, p. 32. (Abstract—see Weissman, K.)

Pressey, D.F., A Cryogenic, Low-PPB Range Moisture Analyzer for Process Gases, V. 37, No. 1, p. 31. (Abstract—see Buck, A.L.)

R

Rapa, A.C., Measured effects of Reduced Flow Velocity in a Laminar Flow Cleanroom, V. 37, No. 3, p. 41. (Abstract—see Carr, P.E.)

Reath, M., Use of Residual Gas Analysis in Low-Presure Semiconductor Process Reactors, V. 37, No. 2, p. 57. *Two case studies that represent residual gas analysis contributions to the 0.5-μm process development at the IBM semiconductor facility in Essex Junction, Vermont, are described. The first study describes how particle formation was significantly reduced by the elimination of a suspected source of particle nucleation. The second study shows how undesirable polysilicon oxidation was eliminated with the proper reactor operation and maintenance procedures.* (CC: Identification, Measurement, and Monitoring, Manufacturing Processes, Manufacturing Processes)

Richards, D.P., Effects of Phase Relationship in Helicopter Vibrations, V. 37, No. 6, p. 26. *This paper presents results from work instigated to determine the significance of the phase relationship that occurs between the vibration responses arising from helicopter rotor blade passing frequencies. The work was instigated by an inquiry from the UK Ordnance Board as to whether the phase relationship between rotor blade passing harmonics should be included within the test requirements for ordnance carried in helicopters.* (DTE: Shock and Vibration, Test Tailoring)

S

Salisbury, K., Temperature Spectrums of an Automotive Environment for Fatigue Reliability Analysis, V. 37, No. 6, p. 19. (Abstract—see Hu, J.M.)

Shadman, F., Interactions of Ceramic, Metallic and Polymeric Filters with Gaseous Contaminants, V. 37, No. 3, p. 19. (Abstract—see Haider, A.M.)

Sing, C.K., Design and Certification of High Purity Delivery Systems for Semiconductor Wafer Cleaning Chemicals, V. 37, No. 6, p. 32. (Abstract—see Grant, D.C.)

Sliter, J.W., Pollution Prevention/Environmental Life Cycle Impact Analyses: Are your Products Affected? V. 37, No. 1, p. 36. (Abstract—see Mendias, M.L.)

Smith, D., Design and Certification of High Purity Delivery Systems for Semiconductor Wafer Cleaning Chemicals, V. 37, No. 6, p. 32. (Abstract—see Grant, D.C.)

Sullivan, J., Proposed Method 510.4 Sand and Dust (Technical Department Reports), V. 37, No. 5, p. 19. *This paper presents new ideas for MIL-STD-810 sand and dust testing that should not only reveal the effects of the environment, but also provide a more cost-effective means of testing.* (DTE: Climatics and Thermal, Criteria and Standards)

Suwa, Y., Effect of Plenum Chamber Configuration on Airflow Uniformity in Unidirectional Flow Cleanrooms, V. 37, No. 4, p. 21. (Abstract—see Xie, G.)

Szymkowiak, E.A., Vibration Test Time Compression and MIL-HDBK-781 vs. MIL-STD-810E, V. 37, No. 1, p. 24. (Abstract—see Caruso, H.J.)

T

Tanner, S.N., Where Have All the Sages Gone? (Rethinking Realism), V. 37, No. 2, p. 29. (Abstract—see Williamson, R.L.,)

Tey, K.Y., Design and Certification of High Purity Delivery Systems for Semiconductor Wafer Cleaning Chemicals, V. 37, No. 6, p. 32. (Abstract—see Grant, D.C.)

Tzeng, H.-M., Characteristics of Particle Deposition on Disks in Disk Drives, V. 37, No. 2, p. 34. *This paper discusses the airflow-related features of particle deposition on disk surfaces in hard disk drives (HDD). Specifically, this study compares the variations of particle deposition on different disks caused by a disparity in flow characteristics. In order to provide insights into the nonuniform nature of particle deposition on disks, the methodology adopted involves the measurement of the spatial distribution of traceable particles on disk surfaces after exposure to flows in the HDD.* (CC: Identification, Measurement, and Monitoring, Manufacturing Processes, Sources and Effects)

U

Underwood, M.A., Multichannel Simultaneous Digital Tracking Filters for Swept Sine Vibration Control, V. 37, No. 5, p. 23. (Abstract—see Pelletier, M.P.)

W

Wai, L.S., Design and Certification of High Purity Delivery Systems for Semiconductor Wafer Cleaning Chemicals, V. 37, No. 6, p. 32. (Abstract—see Grant, D.C.)

Wang, F-C., Design and Certification of High Purity Delivery Systems for Semiconductor Wafer Cleaning Chemicals, V. 37, No. 6, p. 32. (Abstract—see Grant, D.C.)

Wang, H-C., Estimating the Lifetime of Electropolished Stainless Steel (EPSS) Tubing in Corrosive Gas Services, V. 37, No. 4, p. 28. *Tubing lifetime in HCl service, defined as the time to begin particle shedding due to corrosion, can be estimated by the method described in this paper. This could provide an additional selection criterion for materials used in corrosive applications. In this method, particle shedding by a length of electropolished stainless steel tubing is measured before and after its controlled exposure to 100 percent HCl. The shedding is measured in dry nitrogen at several different flow rates.* (CC: Manufacturing Processes, Modeling and Simulation, Sources and Effects)

Weissman, K., Implementation of Acoustic Blankets in Energy Analysis Methods with Application to the Atlas Payload Fairing, V. 37, No. 4, p. 32. *Energy analysis methods are commonly used to predict the vibroacoustic response of a spacecraft inside a launch vehicle payload fairing during liftoff. The payload fairing wall is often lined with acoustic blankets which can be difficult to model. This paper shows the development of a practical working method for accurately representing acoustic blankets in a VAPEPS statistical energy analysis model.* (DTE: Acoustics, Test Tailoring)

Williamson, R.L., Where Have All the Sages Gone? (Rethinking Realism), V. 37, No. 2, p. 29. *This paper explores various mindsets or paradigms that govern how environmental factors in materiel system design and testing are considered. It particularly cautions against hidden paradigms that may restrict initiatives to increase the efficiency of the materiel acquisition cycle. It also explains paradigm shifts from producing and testing prototypes to substituting simulation for hardware where possible to save time and reduce costs.* (DTE: Criteria and Standards, Test Tailoring; PR: Reliability Achievement)

X

Xie, G., Effect of Plenum Chamber Configuration on Airflow Uniformity in Unidirectional Flow Cleanrooms, V. 37, No. 4, p. 21. *The uniformity of airflow distribution in a unidirectional flow cleanroom was studied experimentally and numerically. The influence of the height of the plenum chamber and the velocity of airflow introduced into the chamber on the airflow uniformity are investigated experimentally. A numerical simulation method to predict airflow uniformity was proposed, taking into account the characteristics of the pressure loss of the filter. The calculation domain in this study includes not only the cleanroom but also the plenum chamber and the exhaust chamber. The validity of the numerical method was verified by comparing the simulation results with the experiments. The numerical method was used to obtain an appropriate height for the plenum chamber.* (CC: Cleanroom Design/ Materials, Modeling and Simulation)

Y

Yeo, S.K., Design and Certification of High Purity Delivery Systems for Semiconductor Wafer Cleaning Chemicals, V. 37, No. 6, p. 32. (Abstract—see Grant, D.C.)

Yesenofski, D.F., A Cryogenic, Low-PPB Range Moisture Analyzer for Process Gases, V. 37, No. 1, p. 31. (Abstract—see Buck, A.L.)

Z

Zatko, D.A., A Cryogenic, Low-PPB Range Moisture Analyzer for Process Gases, V. 37, No. 1, p. 31. (Abstract—see Buck, A.L.)

Znamensky, D., Using Simulation to Optimize Gas Distribution Cost and Performance, V. 37, No. 5, p. 30. (Abstract—see McAndrew, J.)

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